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ABSTRACT

The goal of the present study was to examine scenarios for using two schematic organizers, schematic knowledge maps and conceptual matrices, in integrating episodic and semantic knowledge about alcohol. Seventy students (36 males and 34 females) from undergraduate general psychology classes participated for course credit. Participants were assigned to either a schematic organizer group or an essay writing group. These groups were subdivided further into two treatment sequences: episodic/semantic, or semantic/episodic. Sixteen subjects were in the map/episodic-semantic group, 19 were in the map/semantic-episodic group, 17 were in the essay/episodic-semantic group, and 18 were in the essay/semantic-episodic group. The episodic activity required participants to complete materials using their own alcohol-related experiences, whereas the semantic activity required participants to annotate expert materials. Assessment measures used were consumer-satisfaction questionnaires and free-recall tests. While no preferences were established for any one scenario, the episodic activities were rated higher than the semantic activities regardless of the integration sequence. The semantic/episodic integration scenario did produce higher recall scores for the expert information. One table and six figures illustrate the discussion. (Author/SLD)

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Identifying the Best Scenario for Using Schematic Organizers as Integration Tools for Alcohol-Related Information

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Running Head: SCENARIOS

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Abstract

The goal of the present study was to examine scenarios for using two schematic organizers, schematic knowledge maps and conceptual matrices, in integrating episodic and semantic knowledge about alcohol. Seventy students from undergraduate general psychology classes participated for course credit. Participants were assigned to either a schematic organizer group or an essay writing group. These groups were subdivided further into two treatment sequences: episodic/semantic and semantic/episodic. The episodic activity required participants to complete materials using their own alcohol-related experiences, whereas the semantic activity required participants to annotate expert materials. Assessment measures used were consumer-satisfaction questionnaires and free-recall tests. While no preferences were established for any one scenario, the episodic activities were rated higher than the semantic activities regardless of integration sequence. The semantic/episodic integration scenario did produce higher recall scores for the expert information.

Identifying the Best Scenario for Using Schematic Organizers as Integration Tools for Alcohol-Related Information

Many alcohol education/prevention programs attempt to alter behavioral outcomes by presenting presumably new information intended to modify the knowledge structures and behaviors of their participants. Unfortunately, in most of the prior approaches, very little effort has been devoted to the integration of previously developed knowledge structures with those being promoted by the education/prevention program (e.g., Forman & Linney, 1988). Tools are needed that promote the resolutions of conflicts between old and new knowledge leading to a coherent, integrated set of data from which to generate alternatives to current behavior and upon which to base subsequent behavior. If this is not done effectively, the new and old knowledge are compartmentalized and thus compete for control over behavior (Figure 1). There are many indications that in such a competition the old knowledge wins due to differential habit strength and primacy effects. The present experiment is part of a larger project where the general goal is to provide the prerequisites necessary for the reduction of compartmentalization and competition between old and new knowledge by using schematic organizers as integration tools (Figure 2). This research is based on the assumption that integration of old and new knowledge can occur only if both types of memory are represented in the same form. The schematic organizers selected for examination in the present experiment, schematic knowledge maps and conceptual matrices, provide a common form to represent both the old episodic and new semantic information.

Schematic Knowledge Maps

Knowledge maps are two-dimensional node-link-node displays (Figure 3). The nodes contain the main ideas or concepts and the links specify the

Insert Figures 3 & 4 about here

relationship between the nodes. Links are named and given direction using arrowheads (Figure 4). For a thorough description of the TCU mapping system, see Evans and Dansereau (in press) and Lambiotte, Dansereau, Cross, and Reynolds (1989).

Insert Figures 3 & 4 about here

Schematic knowledge maps serve as a bridge between student-generated and expert-generated maps by schematically representing complex systems (Figure 5). When students fill in expert-formatted maps they receive the benefits of active processing without having to struggle with overall map organization. Recent studies indicate that schematic knowledge maps are effective tools for presenting/communicating expert (semantic) information about alcohol use and that they have potential as tools for extracting alcohol-related episodic information from participants (Dees et al., 1991).

Insert Figure 5 about here

Conceptual Matrices

Conceptual matrices and other types of worksheets have been used extensively in decision-making research (e.g., Mann, 1972). Results indicate that worksheets facilitate the production of "optimal" decisions. Worksheets allow individuals to deal with a number of variables simultaneously and provide them with a tool for a good view of the complex relationships between the variables (Halpern, 1989). An example of a conceptual matrix is found in Figure

6. This particular worksheet was given to college students prior to a problem- solving exercise. The results reflect a favorable attitude toward the tool (Dees et al., 1991).

The expert materials used in this study contained information about the nature of identifiable patterns of behavior that underlie and support recurring abuse of alcohol along with the subtle consequences of repeated alcohol use. The pattern maps allowed an individual to see how one can get caught in one or several patterns and the points at which one can choose to enter or exit from the pattern. The expert-generated consequences presented in the conceptual matrix are organized using the SCOPEMS schema (Dees et al., 1991). SCOPEMS is an acronym that represents seven divisions of the self: a) social, b) cognitive/ perceptual, c) overt behavioral, d) physical, e) emotional, f) motivational, and g) spiritual/philosophical.

Both sets of materials, the pattern map and the consequences, have been developed to present information in a factual, value-free manner. They contain important information about alcohol use and abuse that is relatively unfamiliar to the college students who participated in the experiment. It is proposed that presentation of expert-generated material using schematic organizers can facilitate effective and efficient information processing which can lead to subsequent integration of the knowledge with the pre-existing experiential (episodic) database.

Specific Objectives

This experiment was designed to use schematic organizers to present expert alcohol-related information, to extract information about alcohol use episodes from participants, and to determine the best sequence or scenario for using the tools.

Participants were assigned to one of two treatment groups: schematic organizers or essay writing. Essay writing was used because it is analogous to verbal presentations that typically occur in counseling sessions. These groups were further subdivided into two treatment scenarios: episodic/semantic (ES: write about your own experiences (episodic) and then examine the expert information (semantic)) or semantic/episodic (SE: examine the expert information and then write about your own episode).

The specific questions addressed by the present study are as follows:

1. Is writing about one's own experiences (episodic approach) or annotating the expert information (semantic approach) more beneficial in providing participants with information about alcohol-related behaviors, or equipping one to deal with, alter, or monitor alcohol-related behaviors in the future?

2. Are schematic organizers more beneficial than traditional essays in providing information about alcohol-related behaviors or equipping one to deal with, alter, or monitor alcohol-related behaviors in the future?

3. Is one scenario or sequence (episodic to semantic or semantic to episodic) more beneficial in providing participants information about alcohol-related behaviors or equipping one to deal with, alter or monitor alcohol-related behaviors in the future?

4. Does one scenario (episodic to semantic or semantic to episodic) facilitate the recall of alcohol-related information?

5. Do schematic organizers better facilitate the recall of alcohol-related information when compared to traditional essays?

Methods

Subjects

Seventy students from general psychology classes at Texas Christian University participated to fulfill requirements for these courses. The sample consisted of 36 males and 34 females. Subjects were assigned randomly to one of four experimental groups: map/episodic-semantic (MES, n=16), map/ semantic-episodic (MSE, n=19), essay/episodic-semantic (EES, n=17), and essay/ semantic-episodic (ESE, n=18).

Materials

Training and treatment materials. Training materials consisted of a set of instructions for completing and annotating a set of consequences and a behavior pattern associated with alcohol use. The consequences materials took the form of either a list or a structured worksheet (depending on group assignment). The worksheet was designed using the seven SCOPEMS categories of the self. Participants were asked to either complete the worksheet (schematic organizer groups) with consequences of alcohol use for each of the seven divisions or simply to make a list of the consequences associated with alcohol use (essay groups). The annotation materials were either a list or a SCOPEMS worksheet of expert-generated consequences. The behavior pattern materials were presented in either map or essay form. They consisted of a completed sample map or isomorphic essay of a behavior pattern concerning hunger and overeating, a blank map or sheets for an essay, and an expert-generated map or essay of an alcohol-related behavior pattern.

Evaluation materials. The primary questionnaires used in this study each consisted of the following six questions on an eight-point Likert scale:

1) In general, how much new information did you learn about alcohol related behaviors?

2) To what extent did this activity help you identify any gaps in your knowledge about alcohol or alcohol-related behaviors?

3) To what extent did this activity help you gain new ideas or information about general human behaviors?

4) As a result of this activity, do you feel better equipped to talk to a friend who may be having problems with alcohol?

5) How much did this activity help you realize any contradictions in what you know about alcohol and your own drinking patterns?

6) How much will this activity impact your future alcohol-related behaviors? A series of these questionnaires was used to assess specific activities related to the consequences and patterns activities for each day, and for the experiment as a whole (Overall Activity Questionnaire).

Free-recall tests contained instructions to reproduce as much as possible of the expert information that was presented on the expert-completed consequences and patterns sheets.

Procedure

The experiment was conducted in three, two-hour sessions for a total of six hours.

Session 1. Upon arrival, participants were advised of the nature of the experiment and the requirements and benefits of participation. This information was presented in the form of knowledge maps. No other map training was provided. Participants then completed a statement of consent to their participation. The consent forms were collected, and participants were randomly assigned to two groups and moved to separate rooms.

Participants in the SE groups were instructed to annotate a set of expert-generated materials on the consequences of alcohol use. They were to highlight, add, or delete any information that they found particularly relevant, informative, or incorrect, respectively. Participants in the ES groups were given a sheet of alcohol use consequences and instructed to fill it out based on their own experience or the experiences of someone they knew. Schematic organizer groups received this assignment in the form of a SCOPEMS worksheet, whereas the essay groups received either a list of consequences (ESE) or a blank sheet (EES). After completing the assignment, all groups completed the Consequences Questionnaire: Day 1.

Next, SE participants were instructed to annotate a set of expert-generated materials on an alcohol-related behavior pattern. Again, they were instructed to highlight or add any information they deemed necessary. The ES groups were instructed to produce a behavior pattern map based on their own experience or the experiences of an acquaintance. Map groups received this assignment in the form of a schematic map, whereas the essay groups received either a completed essay (ESE) or blank sheets on which to compose an essay (EES). After completing the assignment, all groups completed the Pattern Questionnaire: Day 1.

Session 2. During the second session, participants completed the assignment that they had not done in the first session. For example, the SE groups annotated the expert consequences and pattern during Session 1, so their assignment for session 2 was to fill out consequences and a pattern of their own. In contrast, the ES groups completed their own consequences and pattern on the first day, so they were asked to annotate the expert information during the second session. Again, after completing the consequences assignment,

participants completed the Consequences Questionnaire: Day 2, and after the pattern assignment, participants completed the Pattern Questionnaire: Day 2.

Session 3. Upon arrival for the third session, participants completed the Overall Activity Questionnaire (consumer-satisfaction). Following this activity, they were given 15 min to recall and write down as much information from the expert consequences material as possible. Finally, participants were given 25 min to recall and write down as much information from the expert patterns materials as possible.

Results

Data Reduction and Scoring

The free recalls were scored by a trained and experienced rater using a rating scale developed for this experiment, and with no knowledge of treatment group affiliation. Interrater reliabilities for the recall scorings were determined by having a colleague rescore 15 of each set (consequences and patterns) drawn at random (approximately 20%). Interrater reliability coefficients were as follows: consequences, r=0.85, and patterns, r=0.95.

Primary Analyses

Subjective reactions to consequences and behavior patterns. A three-way ANOVA was conducted on the questionnaire data with TOOL (schematic organizer or essay) and SEQUENCE (semantic-episodic or episodic-semantic) as between -group factors and DAY (first and second) as a within-subject factor. The mean of the items on the questionnaires was used as the dependent measure. While no significant main effects were indicated, a significant interaction was present, $F(1, 66)=27.93$, $p<.0001$, $MSe=3.00$. The means and standard deviations for the interaction are presented in Table 1. The episodic

activities (i.e, completing their own consequences and behavior pattern) were rated higher than the semantic activities irrespective of the order of presentation.

Insert Table 1 about here

A one-way repeated measures ANOVA was conducted with ASSIGNMENT (consequences and behavior pattern) as a within-subject factor and the mean of the items on the questionnaires as the dependent measure. The main effect of ASSIGNMENT was significant, $F(1, 66)=33.90$, $p<.0001$, $MSe=0.35$, with the pattern assignment showing higher means overall ($M=3.37$, $SD=1.58$) than the consequences assignment ($M=2.79$, $SD=1.39$).

Free Recalls. A two-way MANOVA was conducted with TOOL (schematic organizer or essay) and SEQUENCE (semantic-episodic or episodic-semantic) as between group factors and the two recall measures (consequences and behavior patterns) as multiple dependent measures. Multivariate main effects for TOOL, Hotelling's $T^2=13.10$, $F(1, 65)=6.45$, $p<.005$ and SEQUENCE, Hotelling's $T^2=9.83$, $F(1, 65)=4.84$, $p<.05$, were present. A univariate main effect for TOOL was present on the recall of the consequences material, $F(1, 66)=11.71$, $p<.005$, $MSe=46.42$. Schematic organizer groups had higher means ($M=16.00$, $SD=7.31$) than did the essay groups ($M=10.29$, $SD=7.65$). No univariate main effect for TOOL was present on the recall of the pattern material.

A significant univariate main effect for SEQUENCE was indicated on both the recall measures: consequences, $F(1, 66)=4.54$, $p<.05$, $MSe=46.42$; pattern, $F(1, 66)=9.46$, $p<.005$, $MSe=55.15$. On the consequences recall measure, the SE groups had higher means ($M=14.94$, $SD=7.65$) than did the ES groups ($M=11.15$, $SD=6.89$). Similarly, the SE groups had higher means ($M=13.11$, $SD=9.25$) than did the ES groups ($M=7.56$, $SD=4.55$) on the pattern recall.

Discussion

The discussion section will be divided as follows: a) implications of the present study on alcohol and drug education programs, and b) directions for future research.

Implications of the Present Study on Alcohol and Drug Education Programs

Although no preferences were established for any one scenario (sequence), the episodic activities (i.e., the analysis of a personal alcohol-related behavior pattern) were rated higher than the semantic activities, regardless of integration scenario. Participants reported a greater benefit from the examination of their own behavior patterns than from the presentation of expert-generated alcohol-related information. The present findings suggest an important consideration for alcohol education programs . Substance abuse prevention programs that focus on expert information about the effects and consequences of alcohol often report unsatisfactory results (e.g., Forman & Linney, 1988). The present results suggest that more time and effort should be spent on the examination of each individual's episodic knowledge related to alcohol use than on the presentation of expert information.

In addition, the behavior pattern assignment was preferred over the consequences assignment. Again, perhaps traditional alcohol education programs dwell on the negative consequences of alcohol use when they should emphasize the more subtle, negative patterns of behavior that include the use of alcohol.

Finally, the semantic-episodic integration scenario did produce higher recall scores for both the consequences and behavior pattern information. Perhaps this finding is due in part to a primacy effect or that the episodic-semantic groups were victims of proactive interference. The examination of their

own consequences and behavior patterns may have interfered with the encoding of the expert generated information presented later.

Directions for Future Research

While it appears that schematic knowledge maps and conceptual matrices provide an effective means for representing episodic and semantic knowledge in a common form, it is yet to be demonstrated that these tools actually promote the integration of both types of information. Future research should include a means for measuring subsequent integration of knowledge, quite possibly by having participants "map out" their knowledge both prior to and after exposure to the treatment. This would allow for the examination of the participant's knowledge structure. Ideally, then a follow-up interview would occur to ask participants about changes in alcohol-related behaviors.

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Table 1. Means and Standard Deviations for the DAY X SCRIPT Interaction.

		Semantic-Episodic	Episodic-Semantic
First Day	M	2.83	3.48
	SD	1.78	1.77
Second Day	M	3.46	2.54
	SD	1.69	2.01

Figure Captions

Figure 1. Compartmentalization of old and new knowledge structures resulting from a lack of precise integration activities.

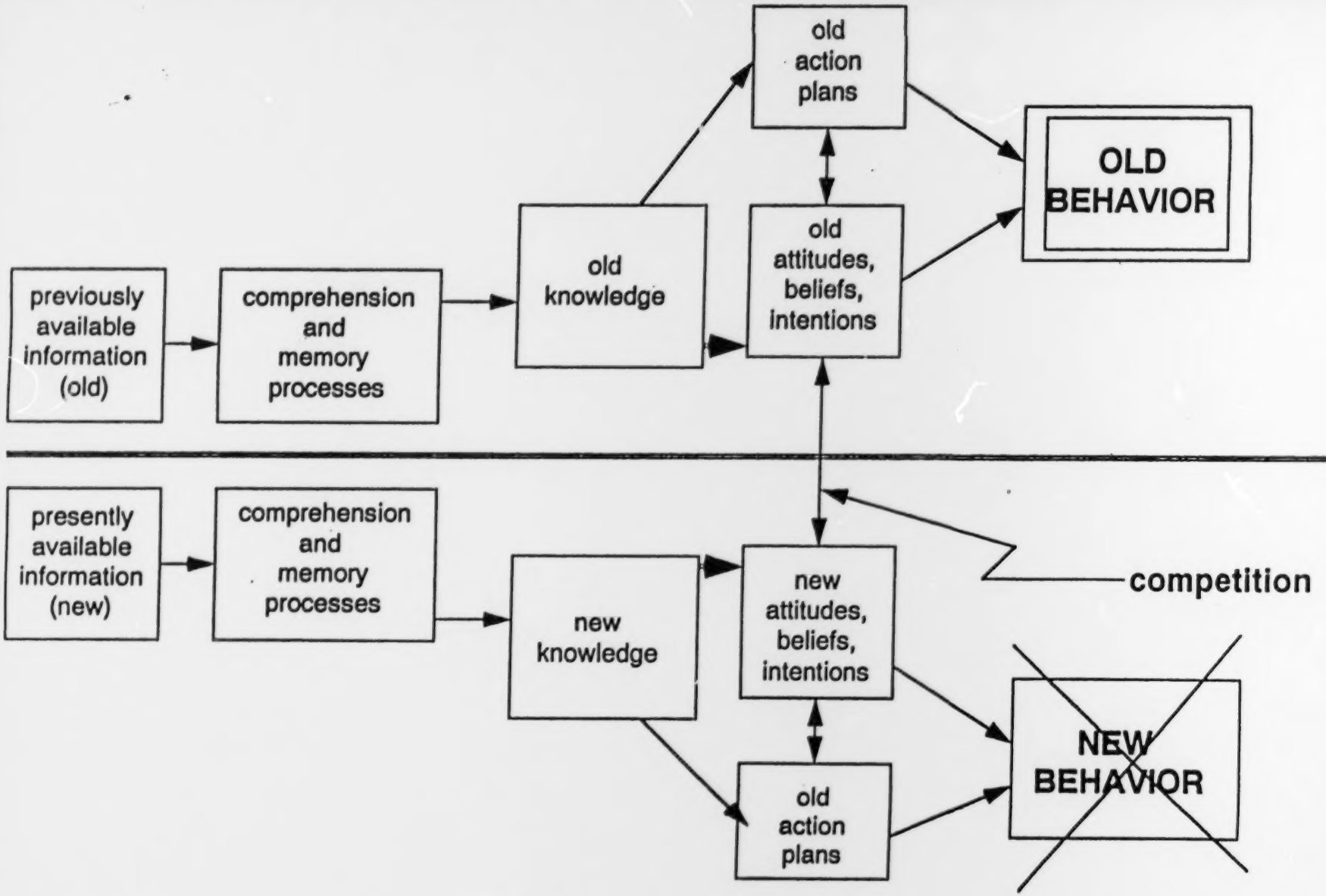
Figure 2. Facilitating the acquisition of "new" knowledge and its integration with "old" knowledge.

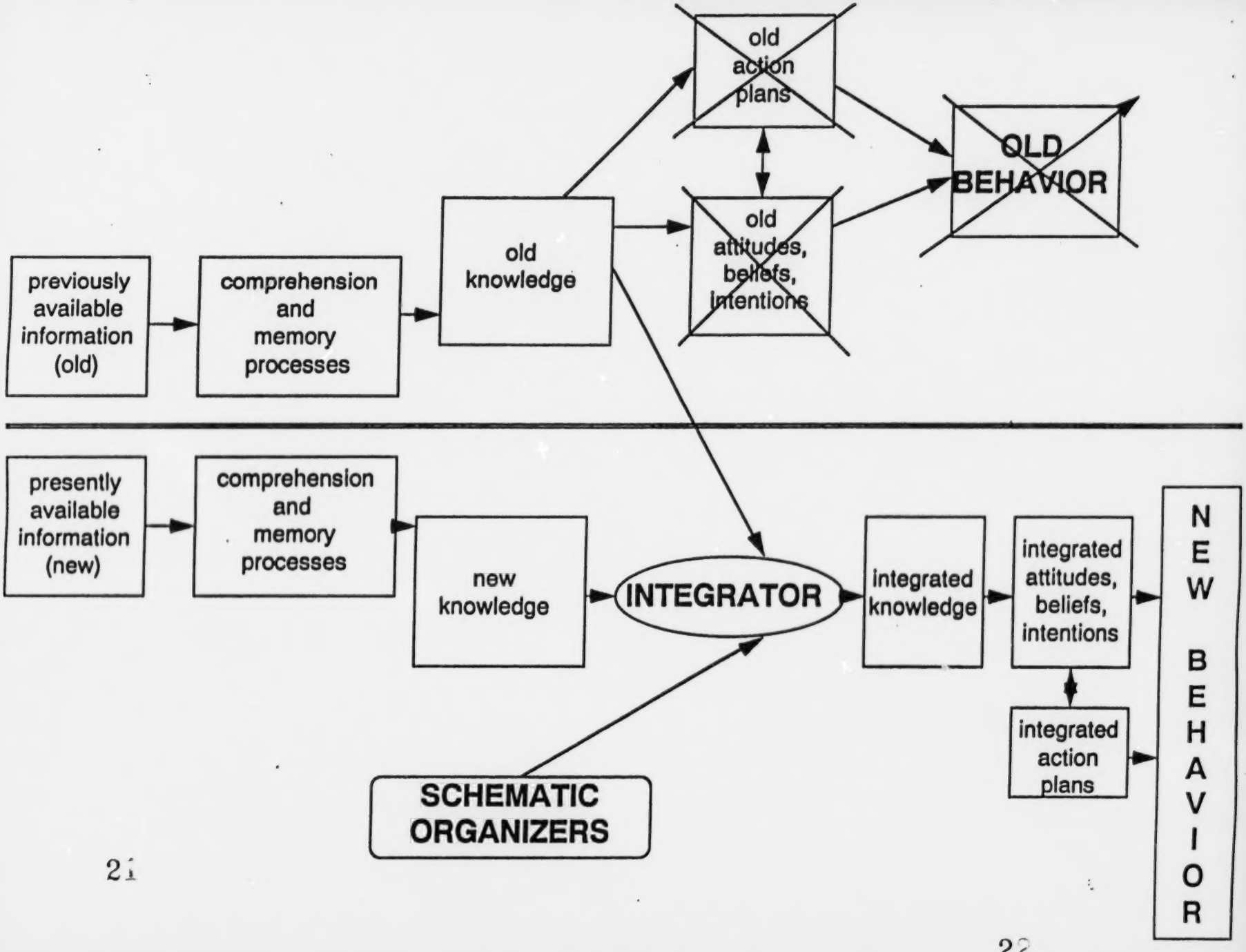
Figure 3. Knowledge map.

Figure 4. Link types.

Figure 5. Schematic Knowledge Map.

Figure 6. Conceptual Matrix.


old action plans
OLD BEHAVIOR
previously available information (old)
comprehension and memory processes
old knowledge
old attitudes, beliefs, intentions
presently available information (new)
comprehension and memory processes
new knowledge
new attitudes, beliefs, intentions
competition
old action plans
NEW BEHAVIOR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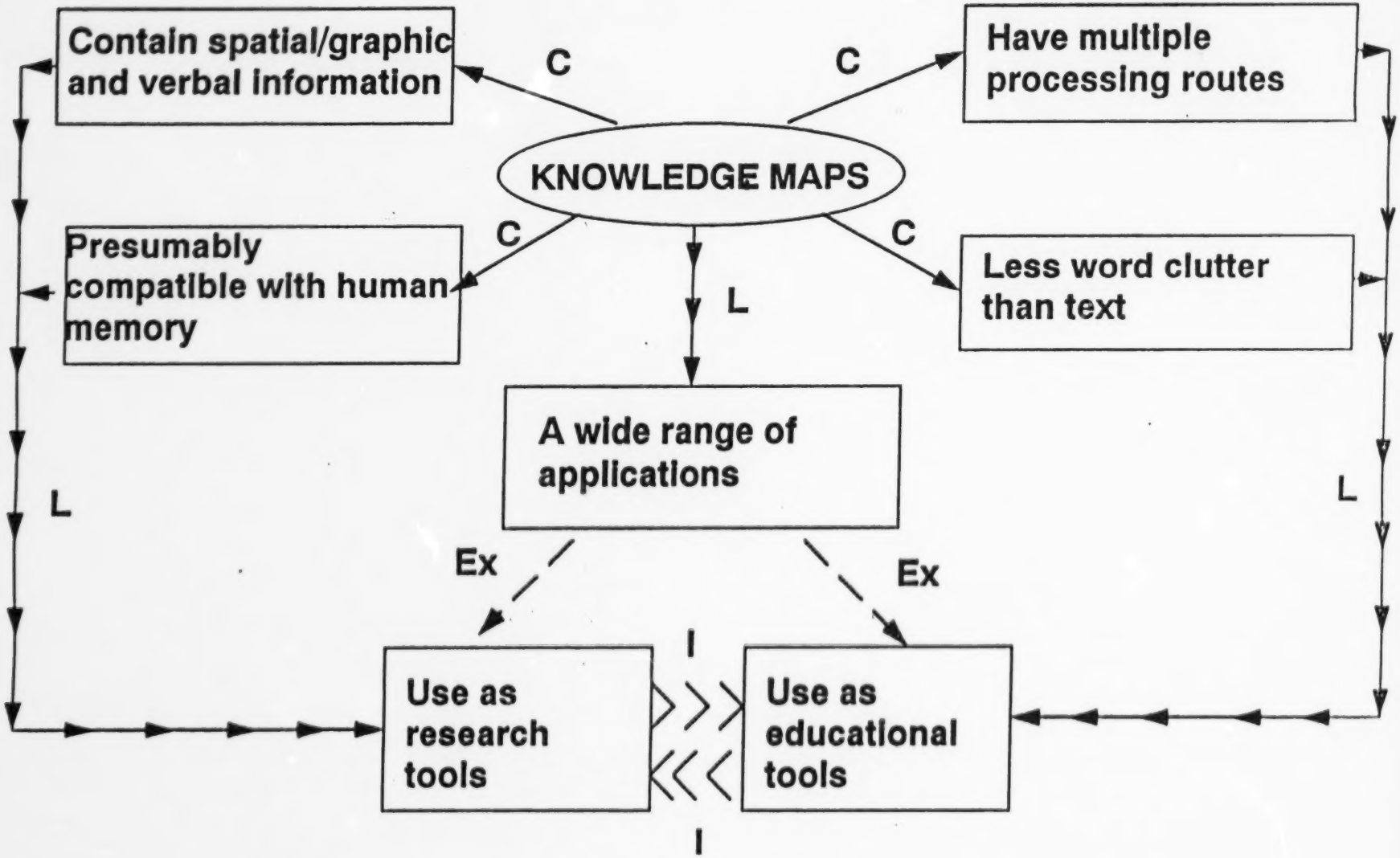
new knowledge
INTEGRATOR
integrated knowledge
integrated attitudes, beliefs, intentions
integrated action plans
NEW BEHAVIOR
SCHEMATIC ORGANIZERS


Contain spatial/graphic and verbal information
C
C
Have multiple processing routes
KNOWLEDGE MAPS
C
C
Presumably compatible with human memory
L
Less word clutter than text
A wide range of applications
L
L
Ex
Ex
I
Use as research tools
Use as educational tools
I

	NAME	SYMBOL	EXAMPLE	INTERPRETATION
DYNAMIC	LEADS TO	L	Intense studying —L→ Good grades	"Intense studying leads to good grades."
	NEXT	N	Brush your teeth —N→ Comb your hair	"First brush your teeth, and next comb your hair."
	INFLUENCES	I	Anxiety —I→ Test performance	"Anxiety influences test performance."
DESCRIPTIVE	TYPE	T	Dog —T→ Poodle	"One type of dog is a poodle." [Notice that the link name is used first in creating sentences involving descriptive links.]
	PART	P	Dog —P→ Tail	"One part of a dog is its tail."
	CHARACTERISTIC	C	Most Dogs —C→ Bark	"A characteristic of most dogs is that they bark."
ELABORATIVE	EXAMPLE	------>	Poker hand —Ex→ Three aces, a 3, and a Jack	"An example of a poker hand is three aces, a 3, and a Jack." [Notice that the link name is used first in creating sentences involving elaborative links.]
	ANALOGY	------>	Hangover —A→ Being stuck in a clothes dryer	"An analogy to a hangover is being stuck in a clothes dryer."
	COMMENT	------>	They should pay teachers less —Co→ ABSOLUTELY NOT	One comment about the idea that they should pay teachers less is "ABSOLUTELY NOT."

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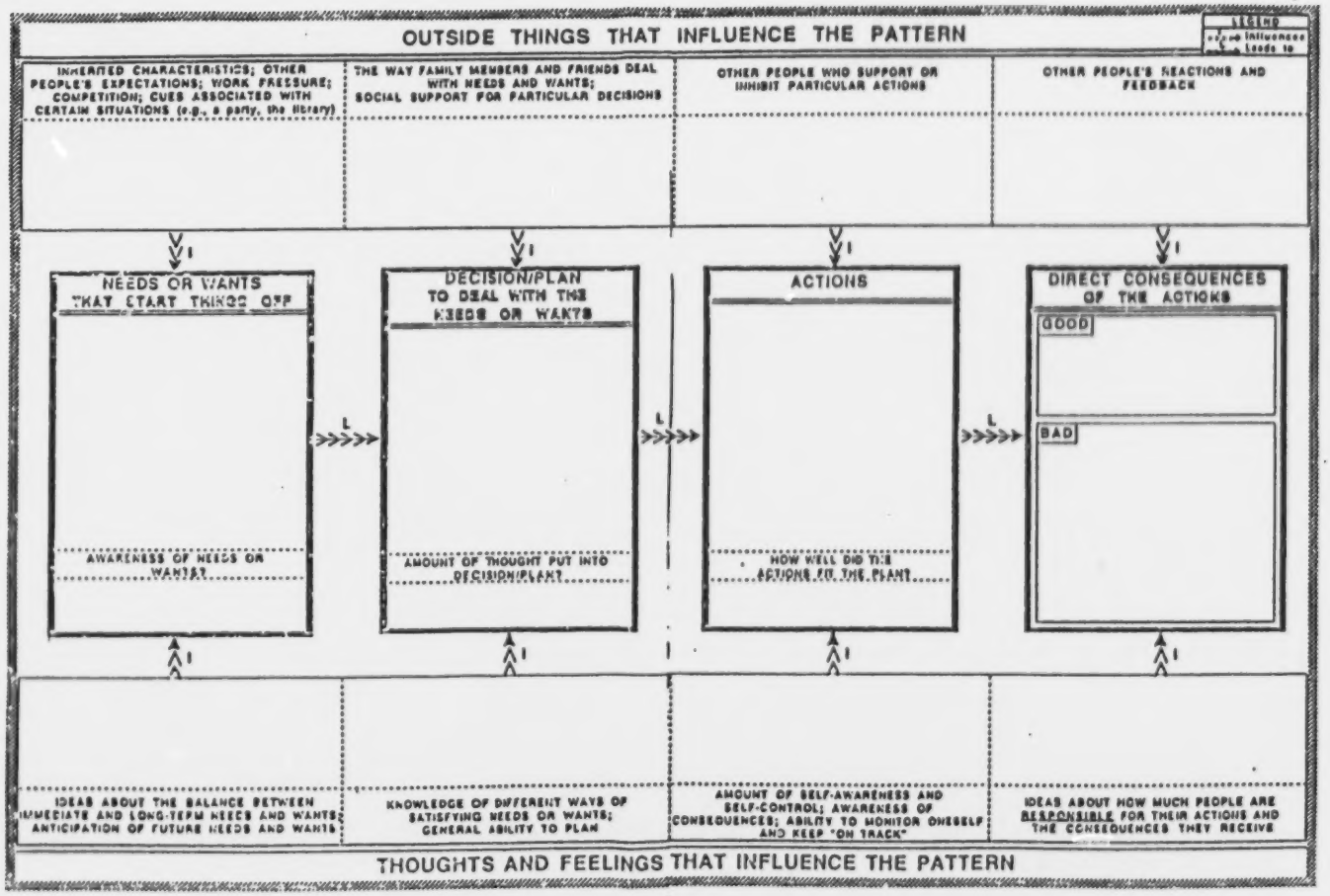
OUTSIDE THINGS THAT INFLUENCE THE PATTERN
LEGEND
no influence
Leads to
INHERITED CHARACTERISTICS; OTHER PEOPLE'S EXPECTATIONS; WORK PRESSURE; COMPETITION; CUES ASSOCIATED WITH CERTAIN SITUATIONS (e.g., a party, the library)
THE WAY FAMILY MEMBERS AND FRIENDS DEAL WITH NEEDS AND WANTS; SOCIAL SUPPORT FOR PARTICULAR DECISIONS
OTHER PEOPLE WHO SUPPORT OR INHIBIT PARTICULAR ACTIONS
OTHER PEOPLE'S REACTIONS AND FEEDBACK
NEEDS OR WANTS THAT START THINGS OFF
AWARENESS OF NEEDS OR WANTS?
DECISION/PLAN TO DEAL WITH THE NEEDS OR WANTS
AMOUNT OF THOUGHT PUT INTO DECISION/PLAN?
ACTIONS
HOW WELL DID THE ACTIONS FIT THE PLAN?
DIRECT CONSEQUENCES OF THE ACTIONS
GOOD
BAD
IDEAS ABOUT THE BALANCE BETWEEN IMMEDIATE AND LONG-TERM NEEDS AND WANTS; ANTICIPATION OF FUTURE NEEDS AND WANTS
KNOWLEDGE OF DIFFERENT WAYS OF SATISFYING NEEDS OR WANTS; GENERAL ABILITY TO PLAN
AMOUNT OF SELF-AWARENESS AND SELF-CONTROL; AWARENESS OF CONSEQUENCES; ABILITY TO MONITOR ONESELF AND KEEP "ON TRACK"
IDEAS ABOUT HOW MUCH PEOPLE ARE RESPONSIBLE FOR THEIR ACTIONS AND THE CONSEQUENCES THEY RECEIVE
THOUGHTS AND FEELINGS THAT INFLUENCE THE PATTERN

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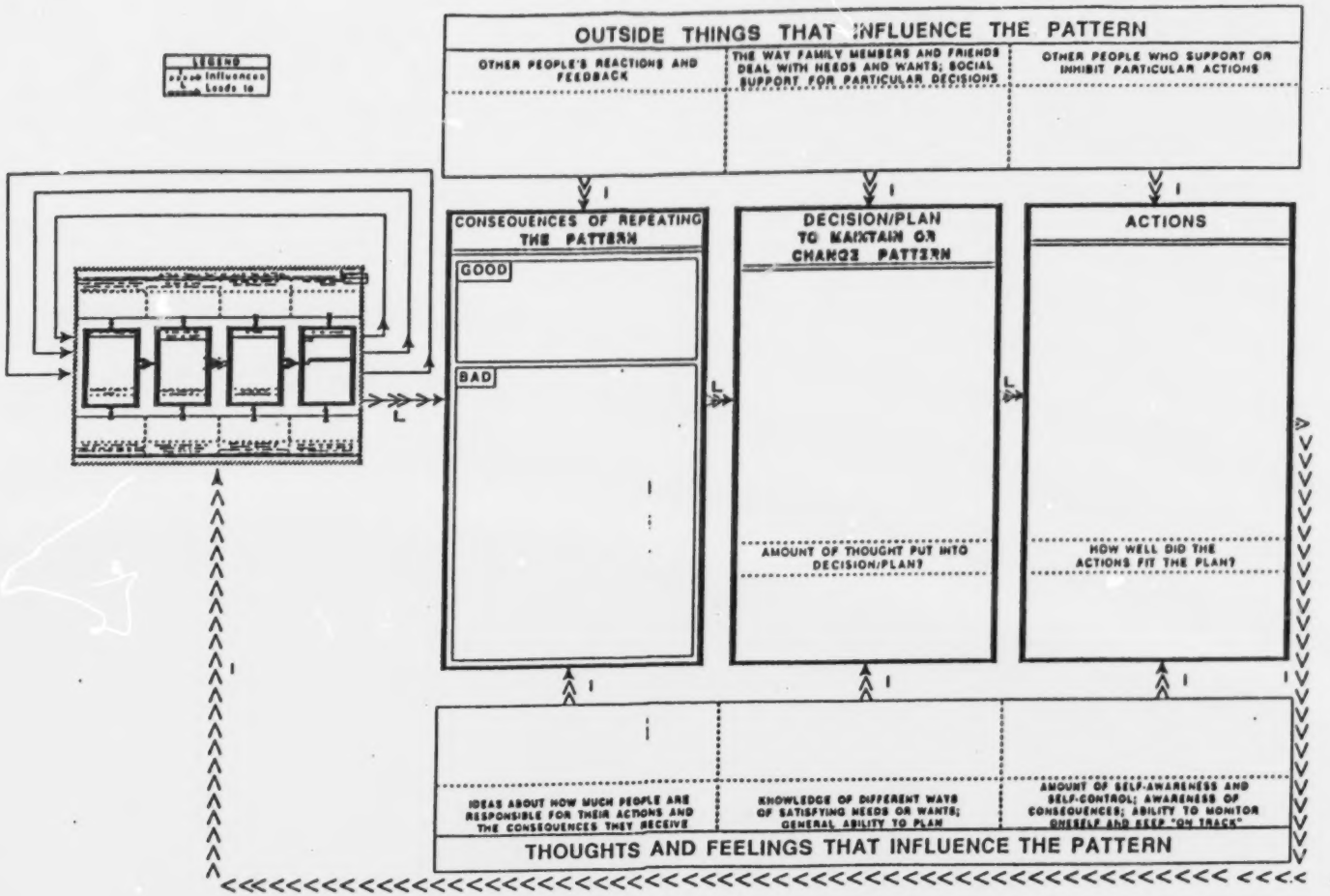
LEGEND
Influences
Leads to
OUTSIDE THINGS THAT INFLUENCE THE PATTERN
OTHER PEOPLE'S REACTIONS AND FEEDBACK
THE WAY FAMILY MEMBERS AND FRIENDS DEAL WITH NEEDS AND WANTS; SOCIAL SUPPORT FOR PARTICULAR DECISIONS
OTHER PEOPLE WHO SUPPORT OR INHIBIT PARTICULAR ACTIONS
CONSEQUENCES OF REPEATING THE PATTERN
GOOD
BAD
DECISION/PLAN TO MAINTAIN OR CHANGE PATTERN
AMOUNT OF THOUGHT PUT INTO DECISION/PLAN?
ACTIONS
HOW WELL DID THE ACTIONS FIT THE PLAN?
IDEAS ABOUT HOW MUCH PEOPLE ARE RESPONSIBLE FOR THEIR ACTIONS AND THE CONSEQUENCES THEY RECEIVE
KNOWLEDGE OF DIFFERENT WAYS OF SATISFYING NEEDS OR WANTS; GENERAL ABILITY TO PLAN
AMOUNT OF SELF-AWARENESS AND SELF-CONTROL; AWARENESS OF CONSEQUENCES; ABILITY TO MONITOR ONESELF AND KEEP "ON TRACK"
THOUGHTS AND FEELINGS THAT INFLUENCE THE PATTERN

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SCOPEMS WORKSHEET

DIVISIONS	STRENGTHS	WEAKNESSES	GOALS
Social (i.e., you interactions and relationahips with other people)			
Cognitive/perceptual (i.e., your thought processes, awareness, memories, concentration)			
Overt behavioral (i.e., your verbal and physical skills and actions)			
Physical (i.e., you health, strength, endurance, energy levels)			
Emotional (i.e., your moods, feelings)			
Motivational (i.e., your needs, goals)			
Spriritual/philosophical (i.e., your morals, ethics, religion, life view)			